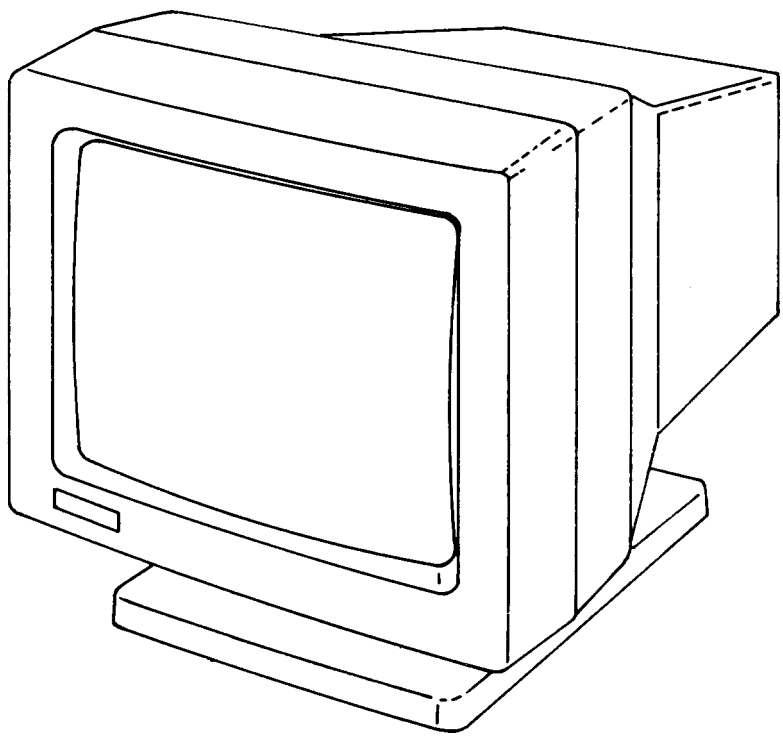
SERVICE MANUAL

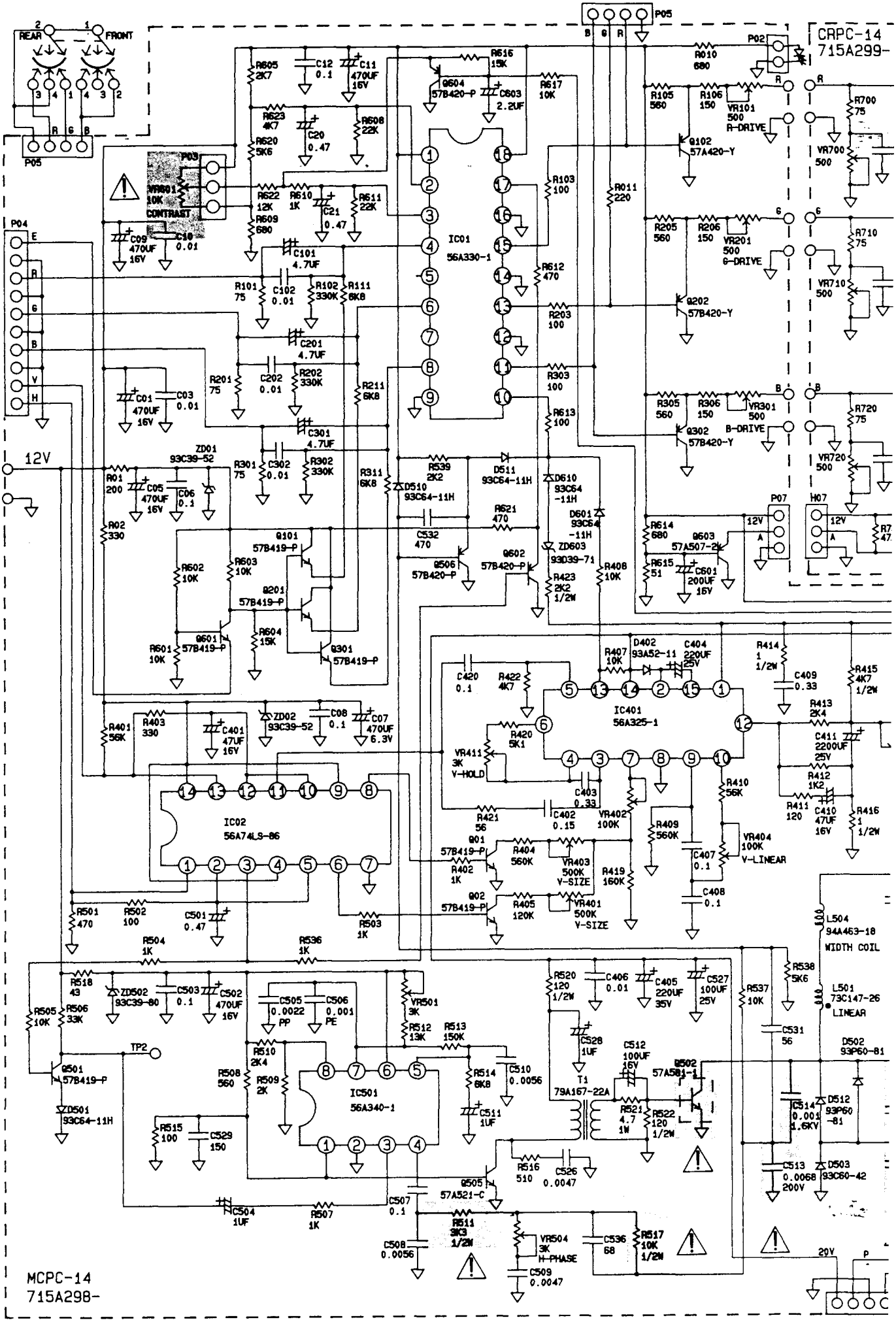
CM-313

COLOR VIDEO MONITOR

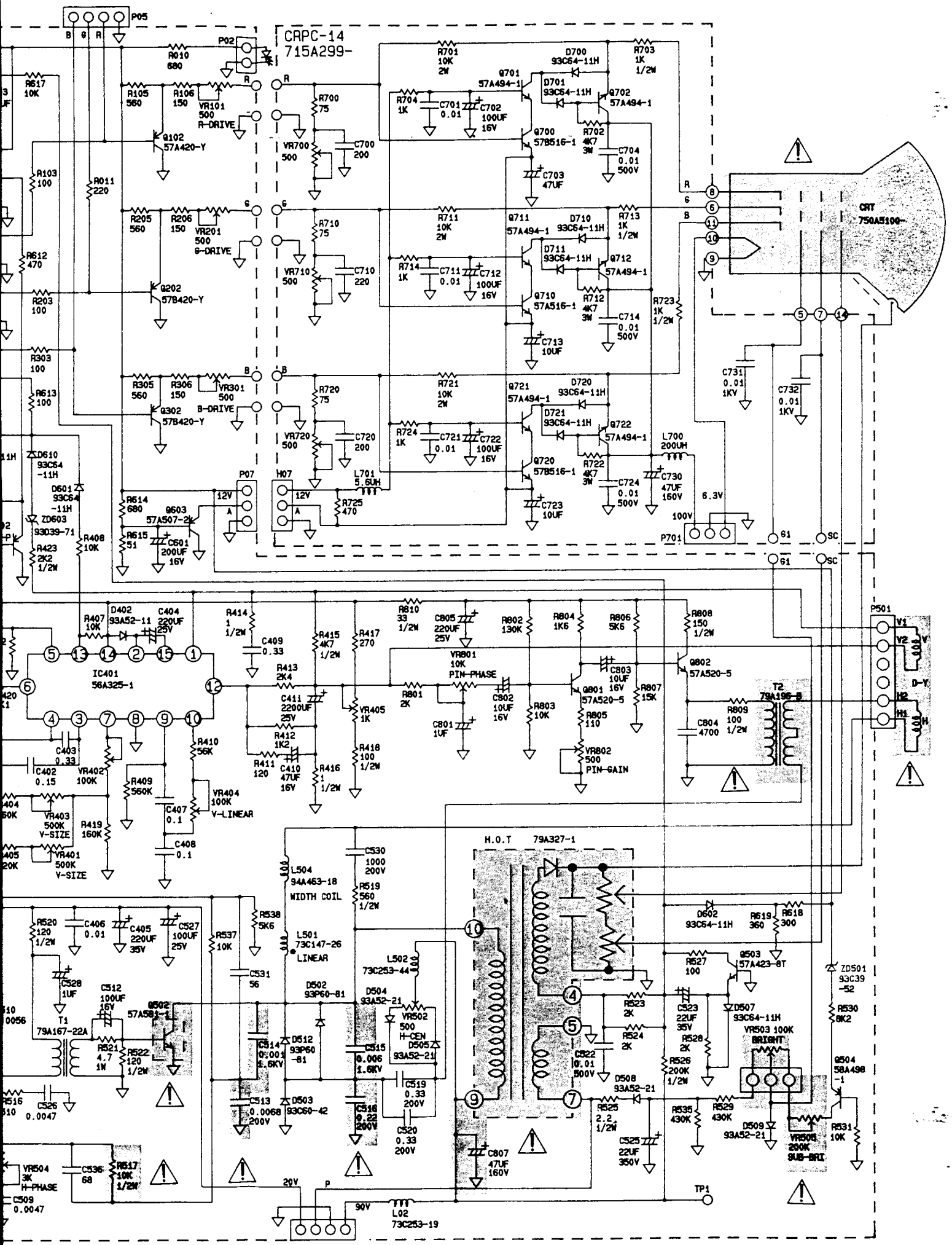


M600

AOC



CM-313 VGA COLOR MONITOR


CRPC-14
715A299-
P05
B G R
P02
R010 680
R617 10K
R105 560
R106 150
VR101 500 R-DRIVE
Q102 57A420-Y
R103 100
R011 220
R612 470
R205 560
R206 150
VR201 500 G-DRIVE
Q202 57B420-Y
R203 100
R303 100
R305 560
R306 150
VR301 500 B-DRIVE
Q302 57B420-Y
R613 100
ZD610 93C54 -11H
D601 93C54 -11H
ZD603 93D39-71
R408 10K
R423 2K2 1/2W
R614 680
Q603 57A507-2
R615 51
C601 200UF 16V
P07
H07
12V
A
L701 5.6UH
R725 470
R700 75
VR700 500
C700 200
R710 75
VR710 500
C710 220
R720 75
VR720 500
C720 200
R701 10K 2W
Q701 57A494-1
D700 93C64-11H
D701 93C64-11H
Q702 57A494-1
R704 1K
C701 0.01
C702 100UF 16V
Q700 57B516-1
R702 4K7 3W
C704 0.01 500V
C703 47UF
R703 1K 1/2W
R711 10K 2W
Q711 57A494-1
D710 93C64-11H
D711 93C64-11H
Q712 57A494-1
R714 1K
C711 0.01
C712 100UF 16V
Q710 57A516-1
R712 4K7 3W
C714 0.01 500V
C713 10UF
R713 1K 1/2W
R723 1K 1/2W
R721 10K 2W
Q721 57A494-1
D720 93C64-11H
D721 93C64-11H
Q722 57A494-1
R724 1K
C721 0.01
C722 100UF 16V
Q720 57B516-1
R722 4K7 3W
C724 0.01 500V
C723 10UF
L700 200UH
C730 47UF 160V
6.3V
100V
P701
CRT 750A5100-
C731 0.01 1KV
C732 0.01 1KV
G1
SC
R407 10K
D402 93A52-11
C404 220UF 25V
IC401 56A325-1
R414 1 1/2W
C409 0.33
R415 4K7 1/2W
R417 270
R413 2K4
C411 2200UF 25V
R412 1K2
R411 120
C410 47UF 16V
R416 1 1/2W
R418 100 1/2W
VR405 1K
R801 2K
C801 1UF
VR801 10K PIN-PHASE
C802 10UF 16V
R803 10K
R804 1K6
R802 130K
R810 33 1/2W
C805 220UF 25V
R806 5K6
C803 10UF 16V
Q801 57A520-5
R805 110
R807 15K
VR802 500 PIN-GAIN
R808 150 1/2W
Q802 57A520-5
C804 4700
R809 100 1/2W
T2 79A196-B
P501
V1
V2
D-Y
H2
H1
C403 0.33
C402 0.15
VR402 100K
R410 56K
R409 560K
VR404 100K V-LINEAR
C407 0.1
C408 0.1
VR403 500K V-SIZE
R419 160K
VR401 500K V-SIZE
H.O.T 79A327-1
L504 94A463-18 WIDTH COIL
C530 1000 200V
R519 560 1/2W
L501 73C147-26 LINEAR
L502 73C253-44
R520 120 1/2W
C406 0.01
C405 220UF 35V
C527 100UF 25V
C528 1UF
C512 100UF 16V
T1 79A167-22A
Q502 57A581-1
R521 4.7 1W
R522 120 1/2W
C526 0.0047
R538 5K6
R537 10K
C531 56
D502 93P60-81
D504 93A52-21
VR502 500 H-CEN
D505 93A52-21
C514 0.001 1.6KV
D512 93P60 -81
C515 0.006 1.6KV
C513 0.0068 200V
D503 93C60-42
C516 0.22 200V
C519 0.33 200V
C520 0.33 200V
C807 47UF 160V
D602 93C64-11H
R619 360
R618 300
R527 100
Q503 57A423-8T
R523 2K
R524 2K
C523 22UF 35V
D507 93C64-11H
R528 2K
R526 200K 1/2W
C522 0.01 500V
D508 93A52-21
R525 2.2 1/2W
C525 22UF 350V
R535 430K
R529 430K
D509 93A52-21
VR503 100K BRIGHT
VR506 200K SUB-BRI
ZD501 93C39 -52
R530 8K2
Q504 58A498 -1
R531 10K
VR504 3K H-PHASE
C536 68
R517 10K 1/2W
C509 0.0047
20V
P
90V
L02 73C253-19
TP1

4. ADJUSTMENT

4–1 ADJUSTMENT CONDITIONS AND PRECAUTIONS

1. Approximately 30 minutes should be allowed for warm up before proceeding.

2. Adjustments should be undertaken only on those necessary elements since most of them have been carefully preset at the factory.

4–2 MAIN ADJUSTMENTS

NO.	FUNCTION	LOCATION	DESIGNATION
1.	B+ ADJ	PCB-POWER	VR901
2.	R.G.B. DRIVE	PCB-MAIN	VR101, 201, 301
3.	VERT. SIZE FOR ALL MODE	PCB-MAIN	VR402
4.	VERT. SIZE FOR MODE 2	PCB-MAIN	VR403
5.	VERT. SIZE FOR MODE 1	PCB-MAIN	VR401
6.	VERT. HOLD	PCB-MAIN	VR411
7.	VERT. LINEAR	PCB-MAIN	VR404
8.	VERT. CENTER	PCB-MAIN	VR405
9.	HOR. PINCUSHION GAIN	PCB-MAIN	VR802
10.	HOR. PINCUSHION PHASE	PCB-MAIN	VR801
11.	HOR. HOLD	PCB-MAIN	VR501
12.	HOR. PHASE	PCB-MAIN	VR504
13.	HOR. CENTER	PCB-MAIN	VR502
14.	HOR. WIDTH	PCB-MAIN	L501
15.	SUB-BRIGHTNESS	PCB-MAIN	VR505
16.	R.G.B. CUT-OFF	CRT-BOARD	VR700, 710, 720,
17.	BRIGHTNESS	PCB-MAIN	VR508
18.	CONTRAST	PCB-MAIN	VR601

4–3 ADJUSTMENT METHOD

1. Switching regulator unit

   (a) Connect a DC voltage meter between TP1 and ground, than adjust VR901 to be 85Vdc.

   Note: Do not operate Switching regulator unit without any load.

2. Sub-Brightness: VR505

   Measure CRT socket pin #5, adjust VR505 to be –32Vdc.

3. Hor. hold: VR-501

   (a) Connect TP2 to ground.

   (b) Adjust VR501 until the bars (moving bars) are vertical and not slanting to left or right.

   (c) Disconnect TP2 from ground, then VR501 is adjusted properly.

4. Hor. center: VR502

   Adjust VR502 until the raster is just located at center of the panel.
   (If raster is too dim, Adjust the screen VR of FLY-back transformer until raster can be seen)

5. Hor. phase: VR504

   Adjust VR504 until the display picture is located at the center of raster.

6. Hor. width: L501

   Adjust horizontal width coil L501 so that the size of picture is 240mm

7. Vertical linear: VR404

   (a) Select a cross-hatch pattern.

   (b) Adjust VR404 so that vertical linearity is optimum.

8. Vertical size: VR401, 402, 403
   Vertical has three modes. (mode 1, 2, 3,)

   (a) At First, use mode 3, signal that has vertical frequency 60Hz adjust VR402 so that vertical vertical size is 180mm.

   (b) Change to mode 2, adjust VR403 so that vertical size is 180mm

   (c) Change to mode 1, adjust VR401 so that vertical size is 180mm.

9. Pincushion adjustment:

   (a) Using crosshatch pattern, adjust VR801 for symmetry between up-down side.

   (b) Adjust VR802 for straight vertical lines on both sides.

10. Vertical Center: VR405

    Adjust VR405 to center the picture vertically.

11. Vertical Hold: VR401

    Using any pattern generator that has vertical frequency 50Hz and apply to this monitor. If a display quivers upward or downward, turn VR401 on the main PCB to stabilize it.

12. White balance:

    A. Initial set up.

    (a) Disable the video input signal.

    (b) VR101, 201, 301, 700, 710, 720, set to middle position.

    (c) Warm up more than 15 minutes.

B. Bias adjustment.

(a) Adjust G2 potentiometer, check which color is first to appear, then turn cut-off VR of that color (VR700, 710, 720,) to minimum, Again, turn G2 to more light Another color appears. use this cut-off VR for base.

(b) Using a Oscilloscope, adjust the base cut-off VR, so that the black level is 85Vdc.

(c) Adjust another two cut-off VR until a faint neutral white raster is produced.

C. Gain adjustment

(a) Enable all three channels (R. G. B.) to give a cross-hatch pattern on the screen.

(b) Using a oscilloscope, adjust the base drive VR (the same channel as B-(a)), so that the amplitude is 50Vp-p.

(c) Change the pattern to paper white video, turn contrast control to minimum, adjust the luminance is 4 ft/l (fostlambert).

(d) Using a TV color analyzer, adjust the other two cut-off VR (except the base cut-off VR) for a white video corresponding to a color temperature of 9300° K

(e) Turn contrast control so that the luminance is 20 ft/l, adjust the other two drive VR for the same color temperature.

(f) A few reiterations may be required to set the color temperature the same at 4 ft/L and 20 ft/L luminance level.

(g) Turn G2 control for raster to just appear (1 ft/l).

13. Focus adjustment

Turn the contrast control to maximum and set the brightness control to a suitable position, adjust the focus control to the optimum position.

14. Purity adjustment

(a) Be sure that the display is not being exposed to any external magnetic fields.

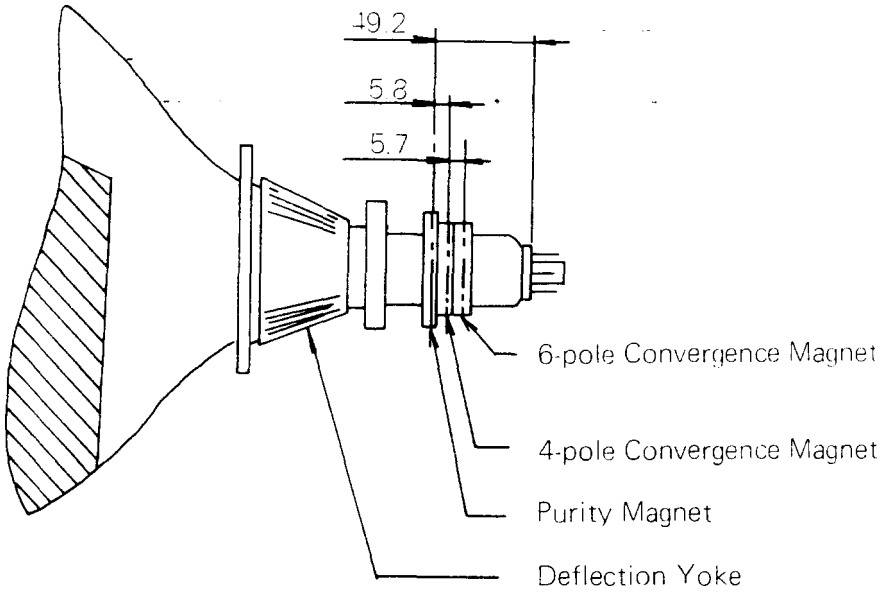
(b) Ensure that the spacing between the Purity, Convergence Magnet, (PCM), assembly and the CRT stem is 29mm +– 1mm. (See below diagram)

(c) Produce a complete, red pattern on the display. Adjust the Purity magnet rings on the PCM assembly to obtain a complete field of the color red. This is done by moving the two tabs in such a manner that they advance in an opposite direction but at the same time to obtain the same angle between the two tabs, which should be approximately 180'.

(d) Check the complete blue and complete green patterns to observe their respective color purity. Make minor adjustments if needed.

RELATIVE PLACEMENT OF TYPICAL COMPONENTS

Dimensions in mm



15. *Convergence adjustment*

(a) Produce a magenta crosshatch on the display.

(b) Adjust the focus for the best overall focus on the display.
Also adjust the brightness to the desired condition.

(c) Vertical red and blue lines are converged by varying the angle between the two tabs of the 4-pole magnets on the PCM assembly. (See above diagrams)

(d) Horizontal red and blue lines are converged by varying the two tabs together, keeping the angle between them constant.

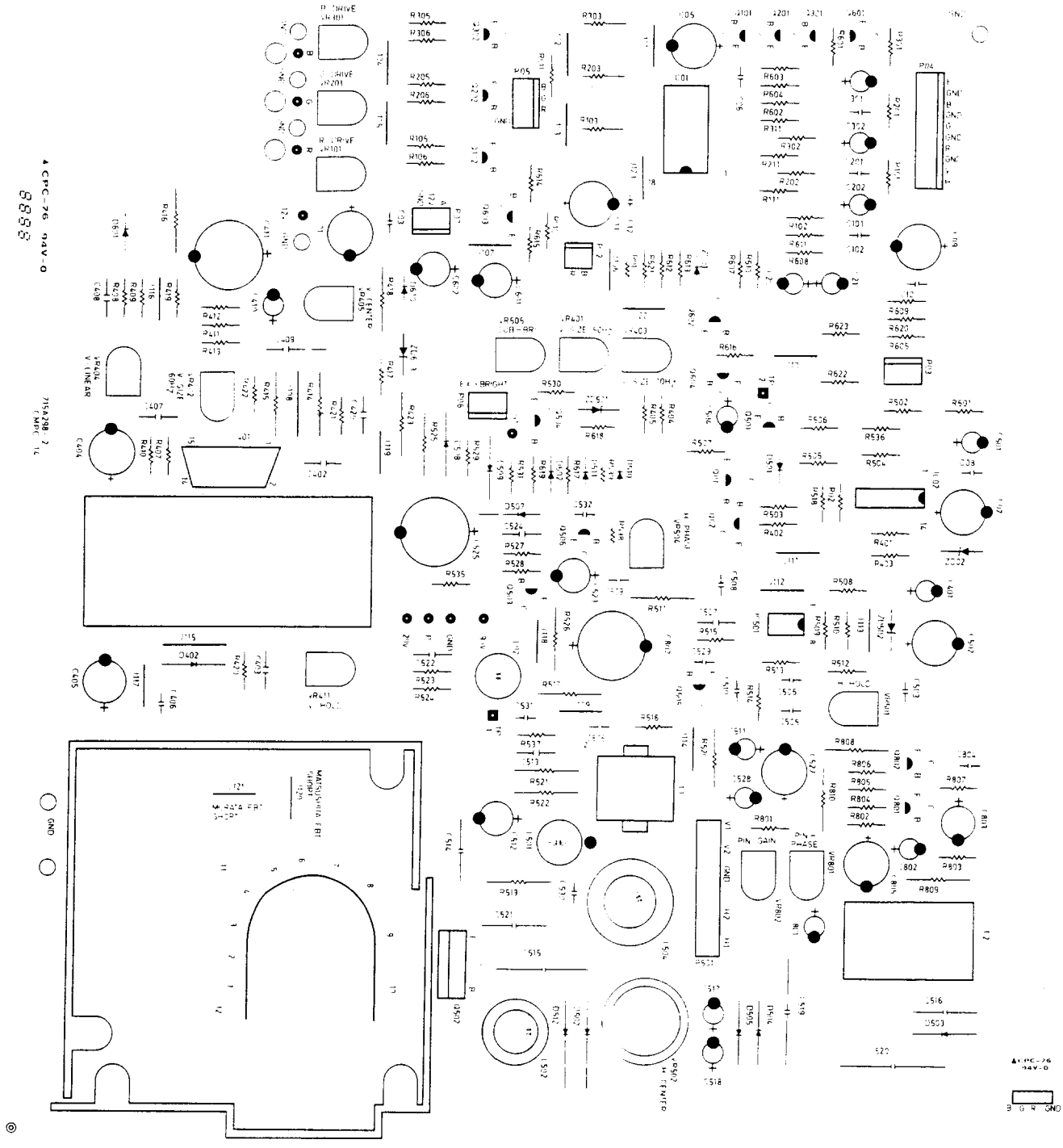
(e) Produce a white crosshatch pattern on the display.

(f) Vertical green and magenta lines are converged by varying the angle between the two tabs of the 6-pole magnets.

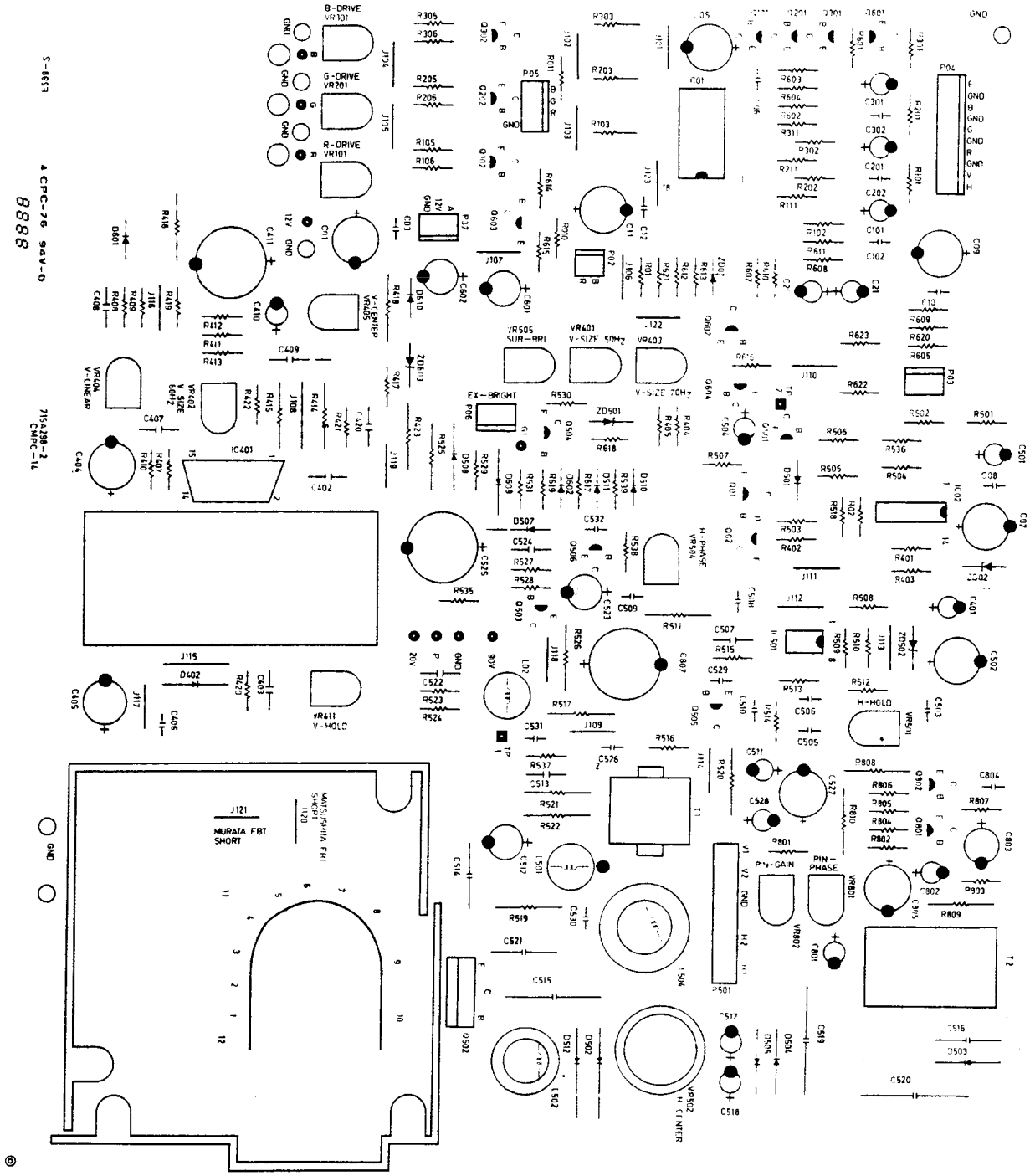
(g) Horizontal green and magenta lines are converged by varying the two tabs together, keeping the angle between them constant.

5 PCB LAYOUT

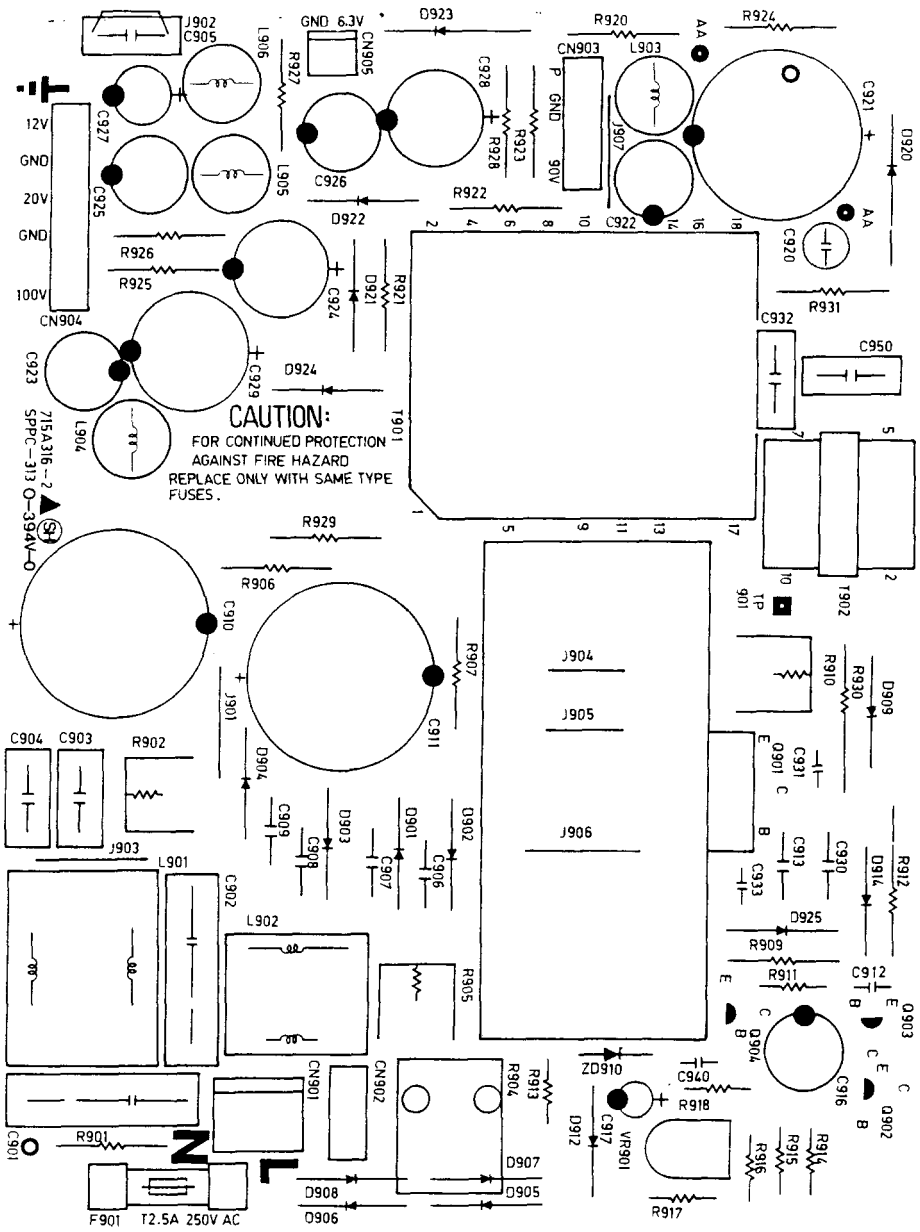
5–1 MAIN PCB COMPONENT SIDE



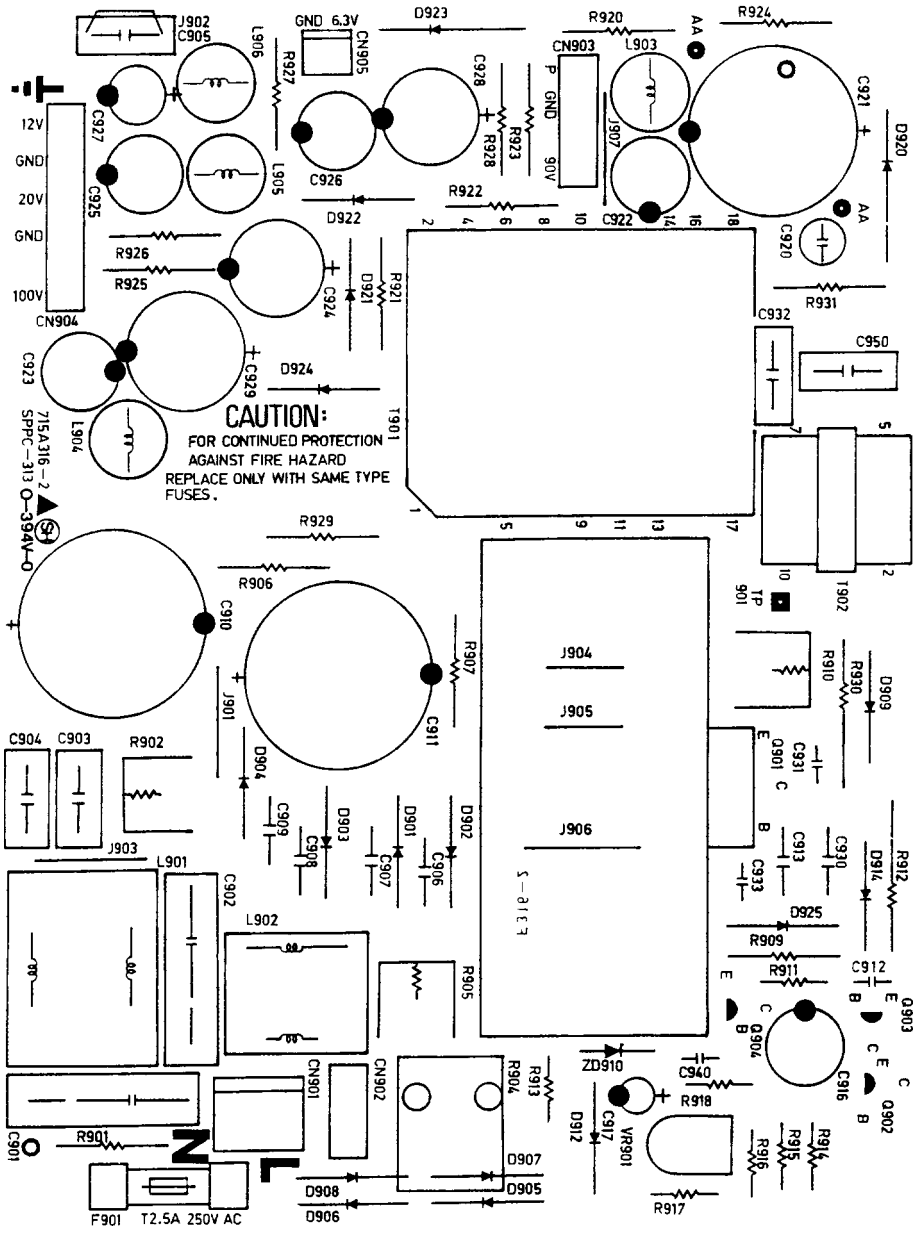
5–2 MAIN PCB LAYOUT

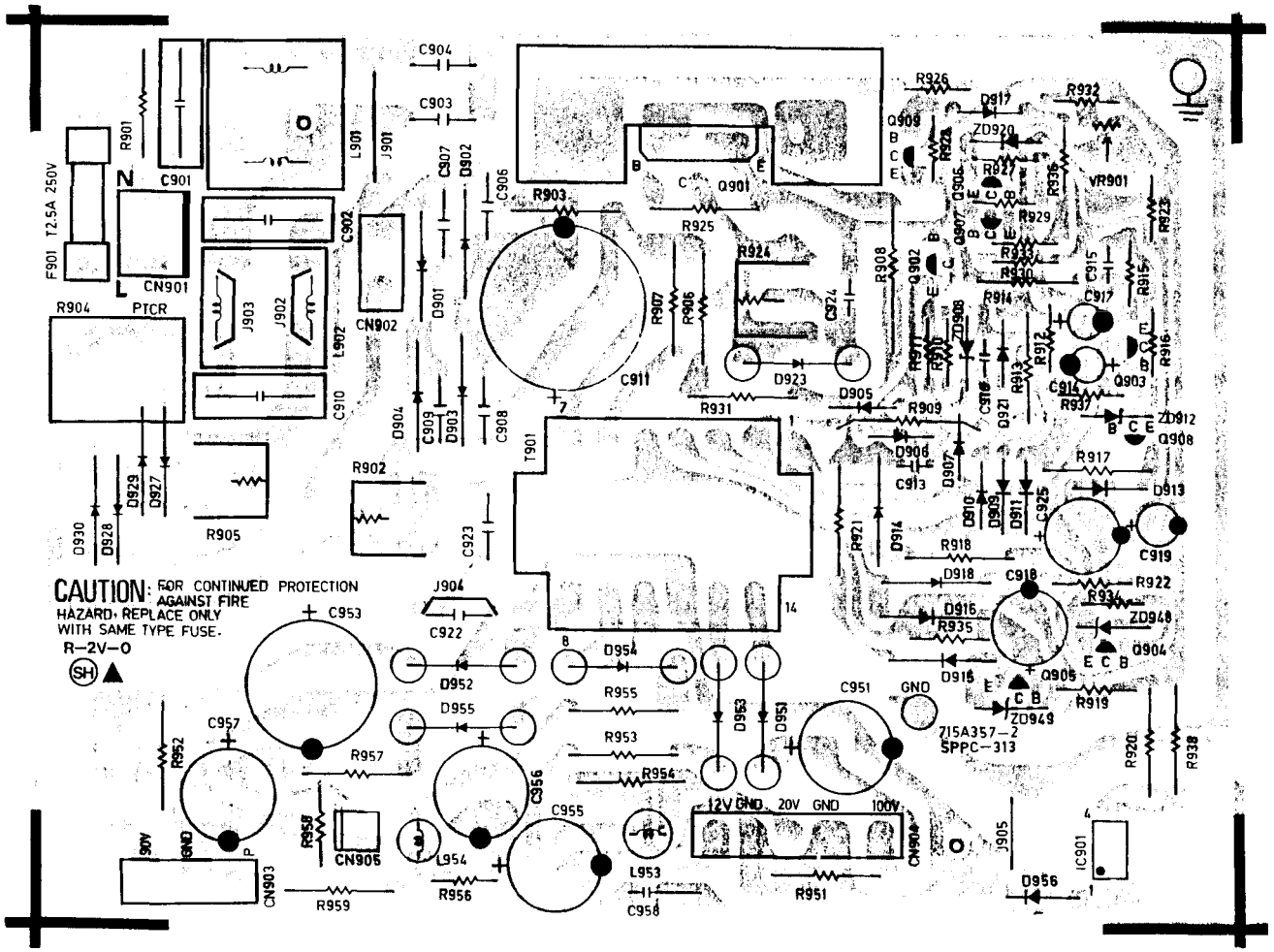


5-3 SMPS COMPONENT SIDE

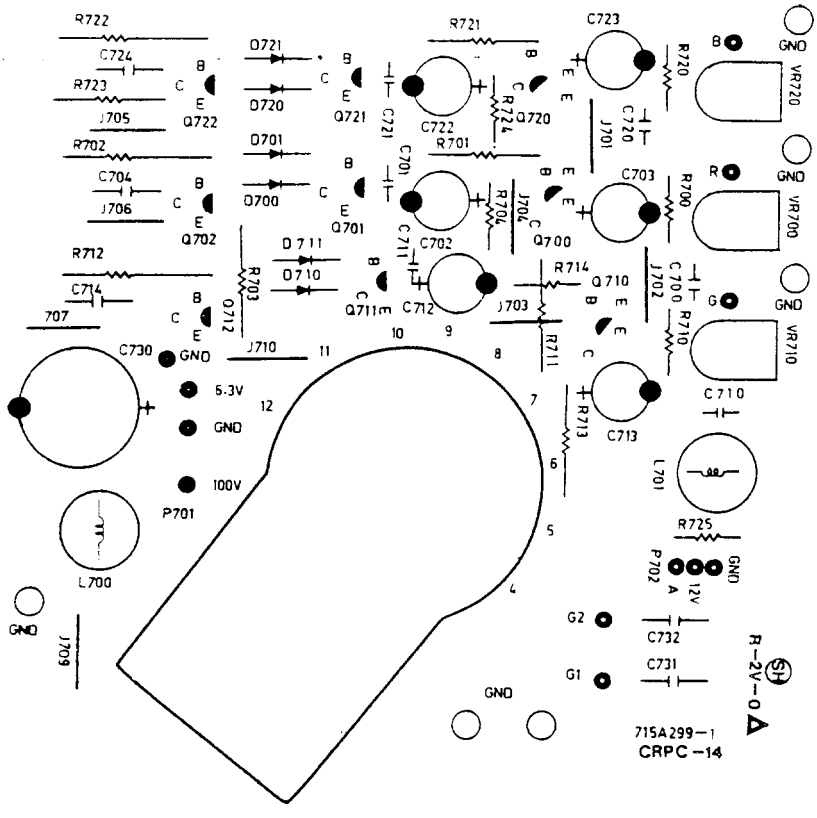


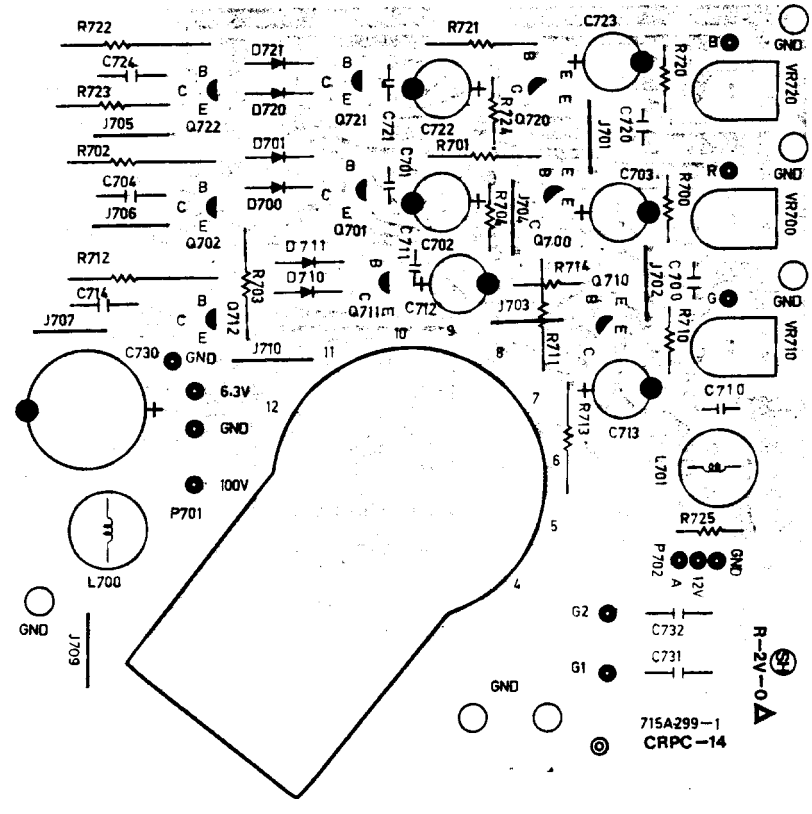
5-4 SMPS LAYOUT



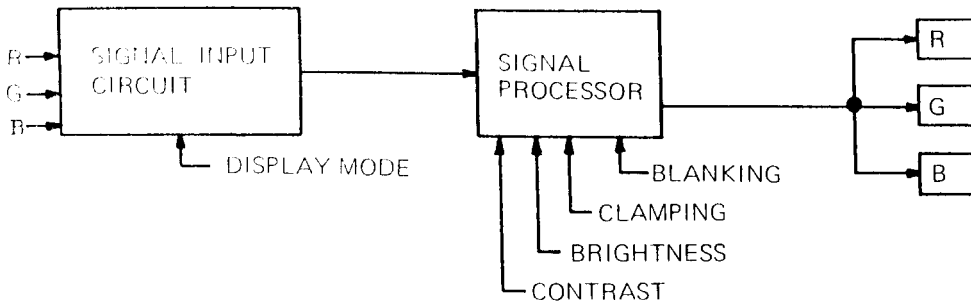

CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE FUSE.
R-2V-O
F901 T2.5A 250V
CN901
PTCR
CN902
CN903
CN905
CN906
IC901
T901
715A357-2
SPPC-313

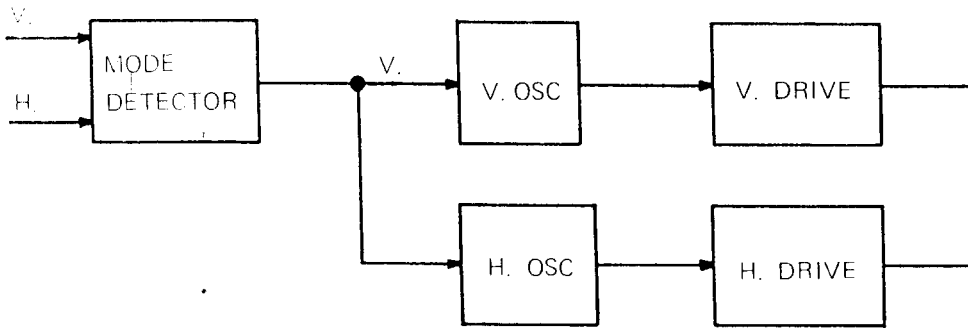
5–5 CRT BOARD PCB LAYOUT & COMPONENT SIDE

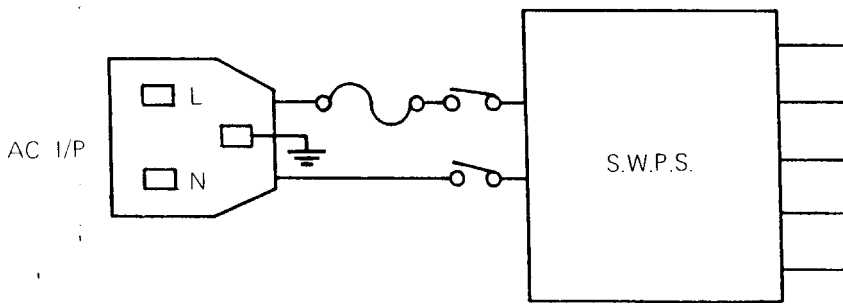


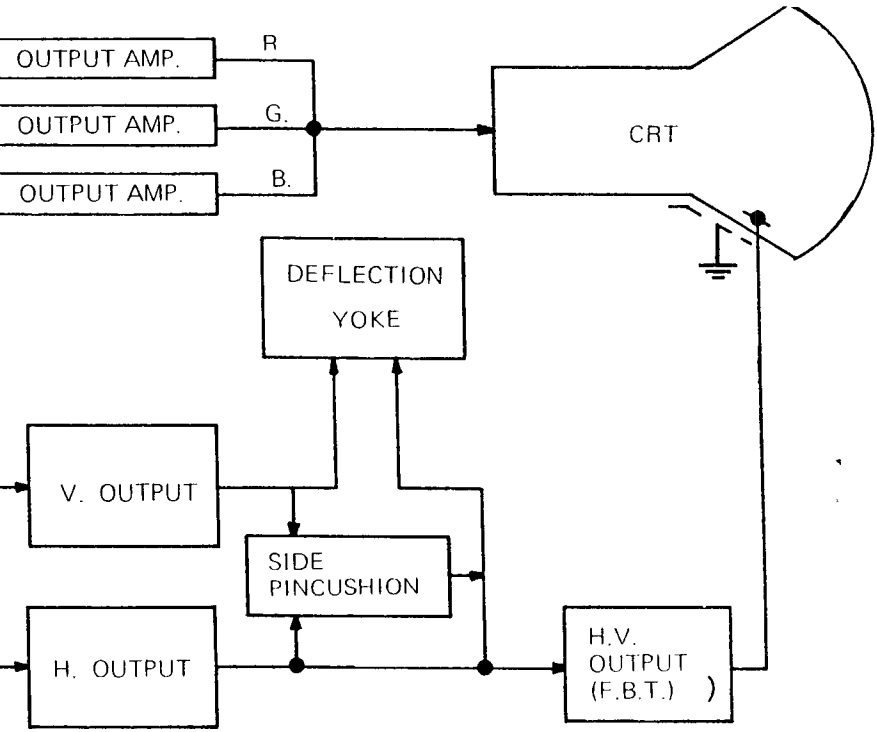


6. BLACK DIAGRAM







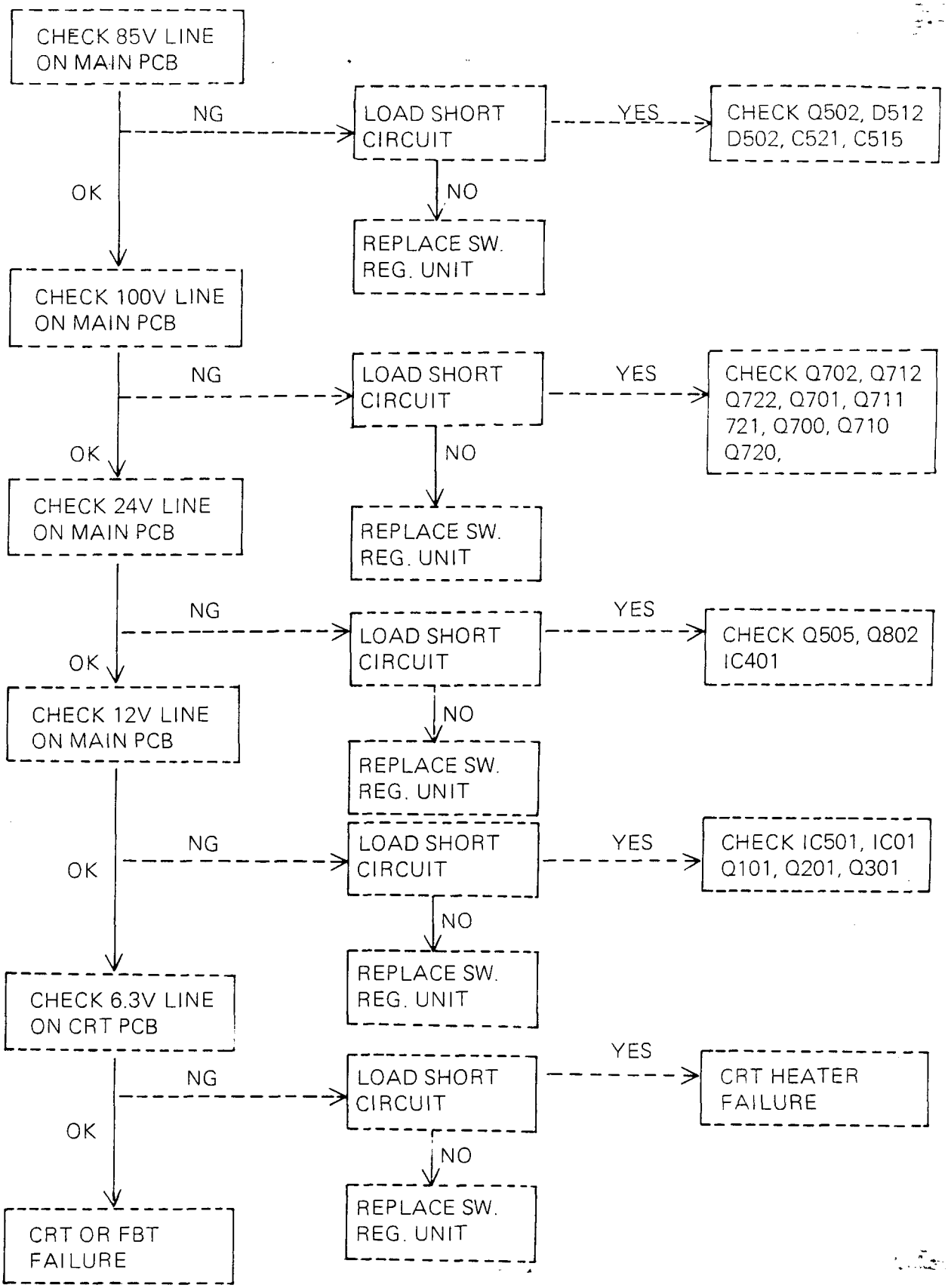


CM-313

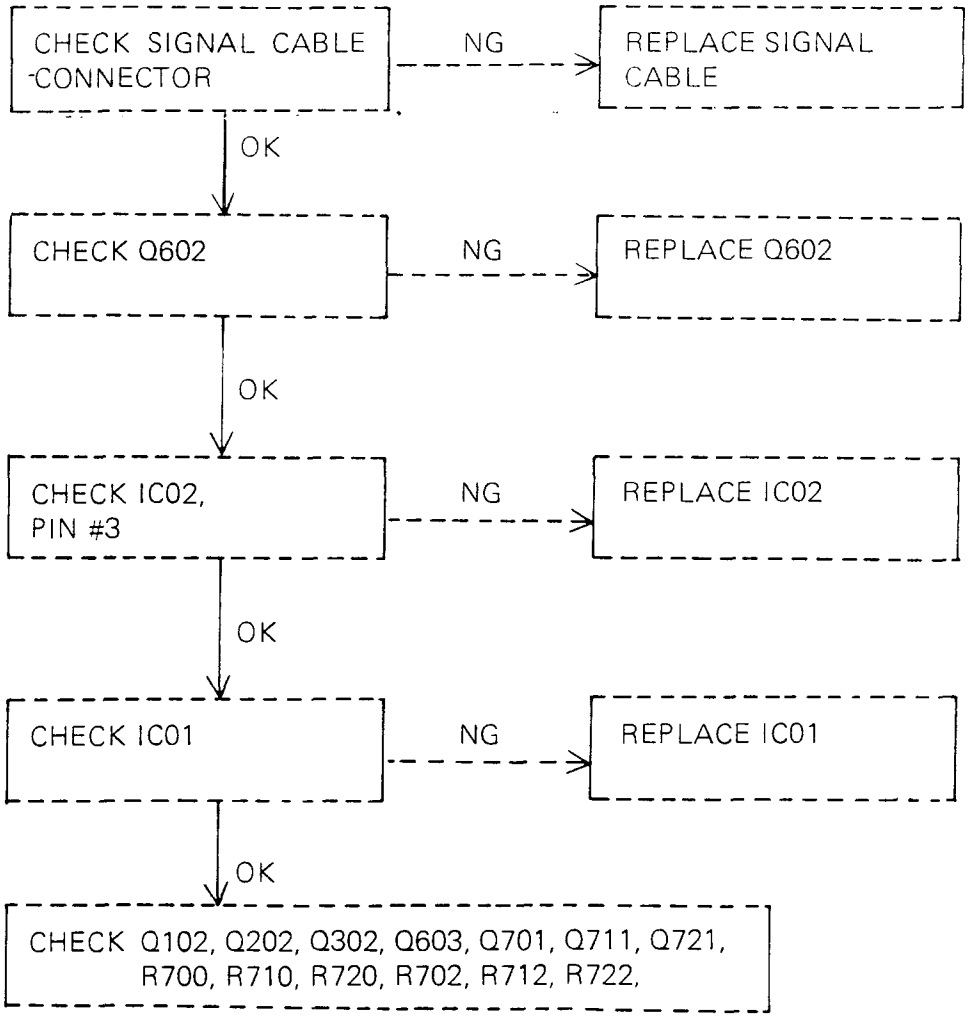
BLOCK DIAGRAM

7. TROUBLE – SHOOTING

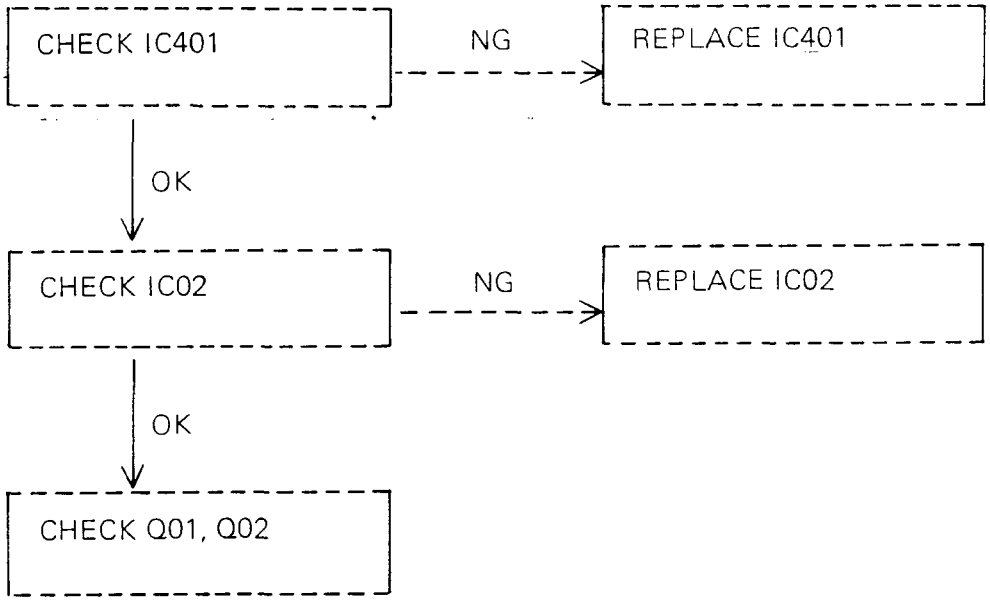
7–1 NO RASTER



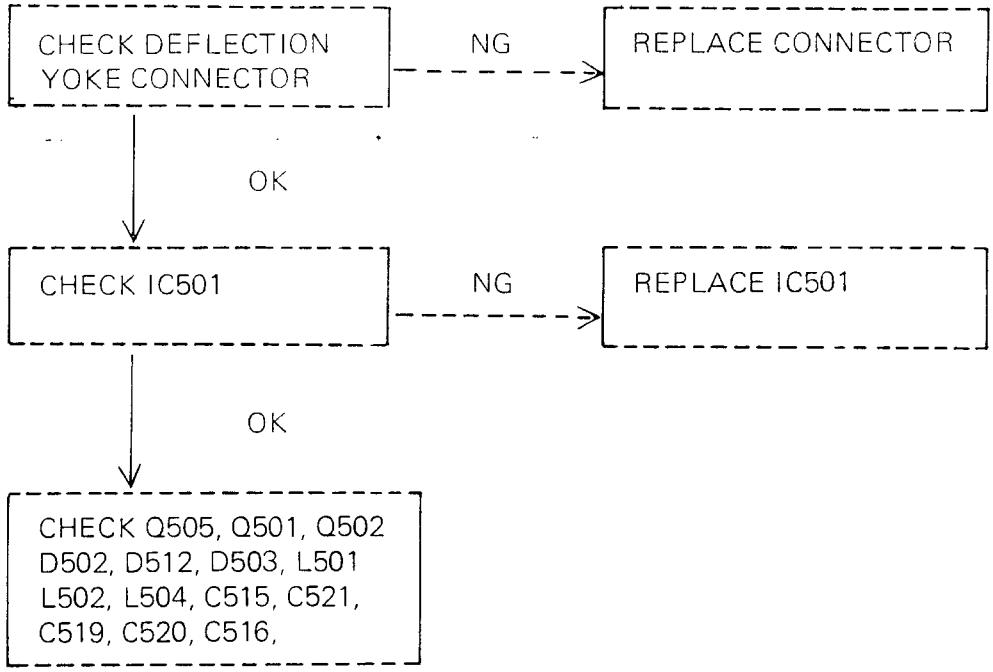
7–2 PICTURE OR SOME COLOR MISSING



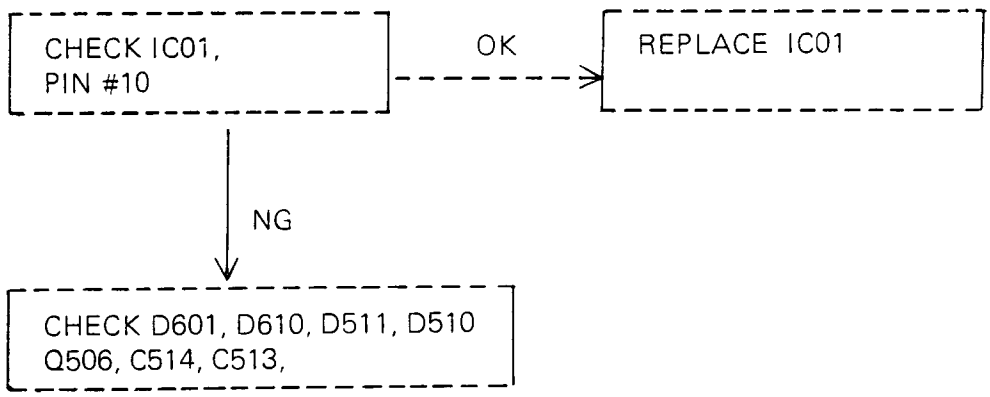
7–3 NO VERT. SCAN (ONE HOR. LINE RASTER)



7–4 NO HOR. SCAN (ONE VERT. LINE RASTER)



7 – 5 VERT RETRACE LINE DISPLAY IN SCREEN

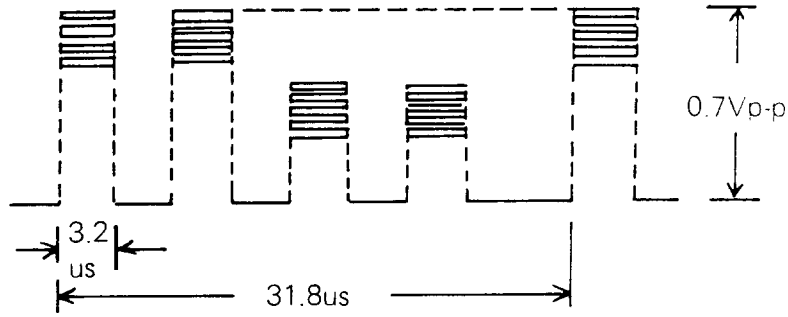


8 WAVEFORM & VOLTAGE

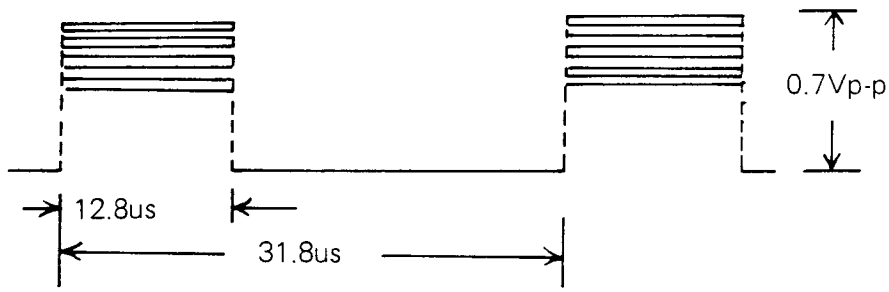
CONDITION : CHROMA – 1000 PATTERN 11

COLOR BAR BRIT & CONT' MAX.

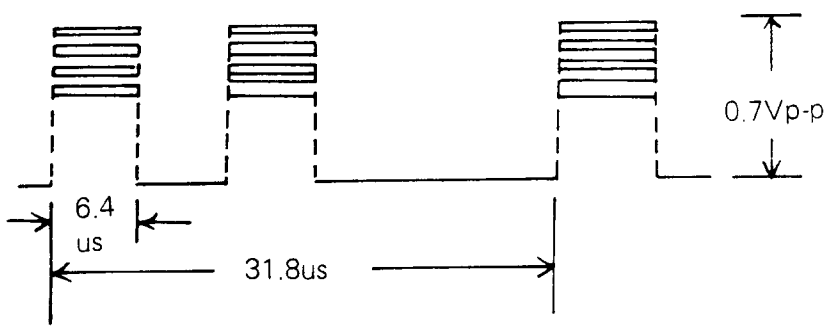
8 – 1 WAVEFORM



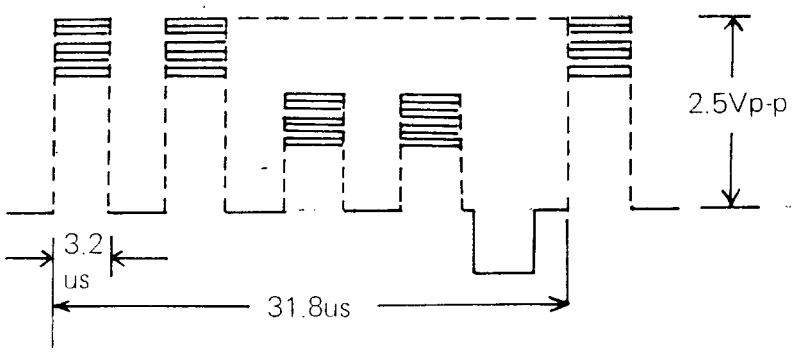
IC01 PIN 8 (FIG. 1)



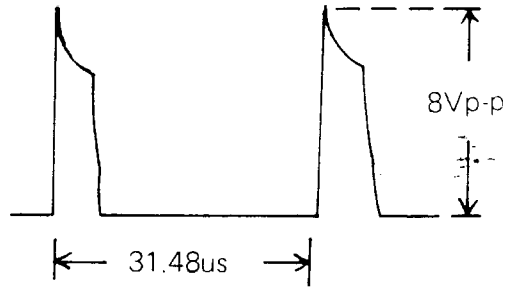
IC01 PIN 6 (FIG. 2)



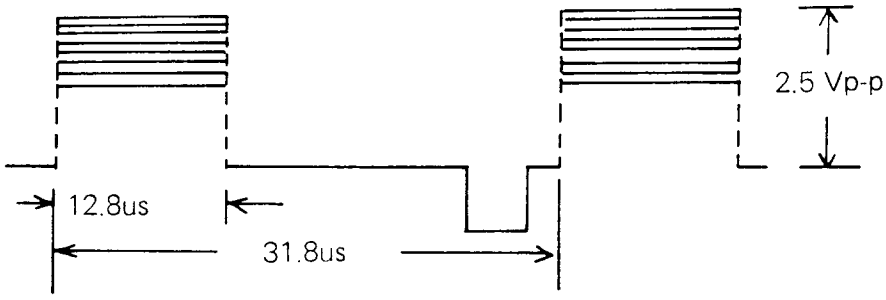
IC01 PIN 4 (FIG. 3)



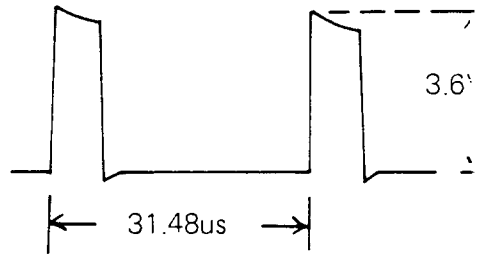
IC01 PIN 11 (FIG. 4)



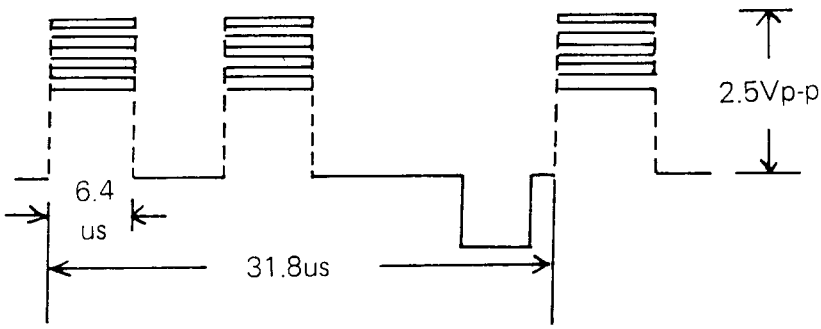
IC01 PIN 10



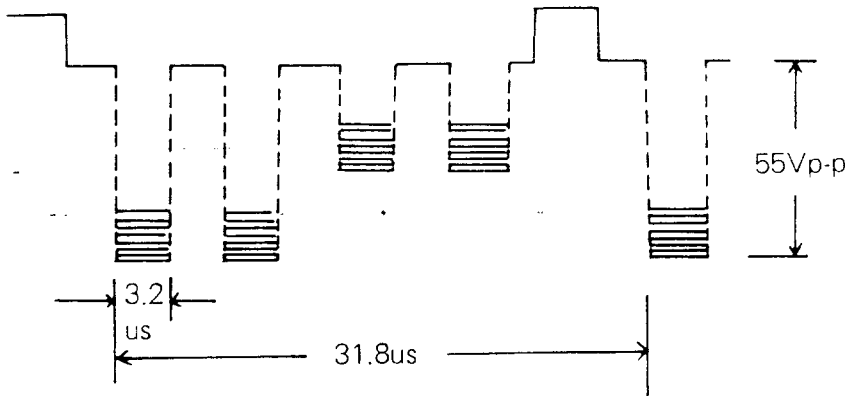
IC01 PIN 13 (FIG. 5)



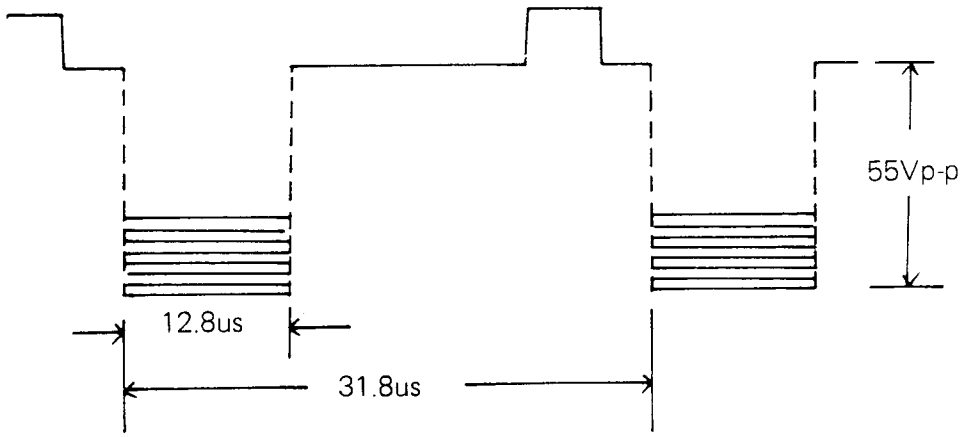
IC01 PIN 17



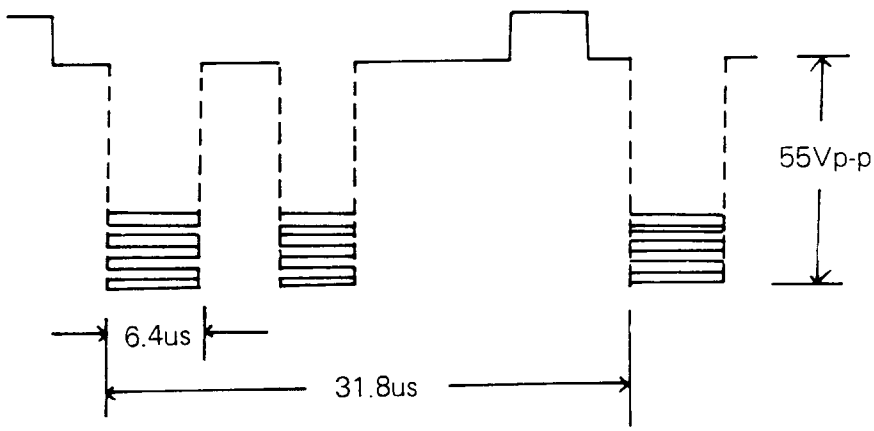
IC01 PIN 15 (FIG. 6)



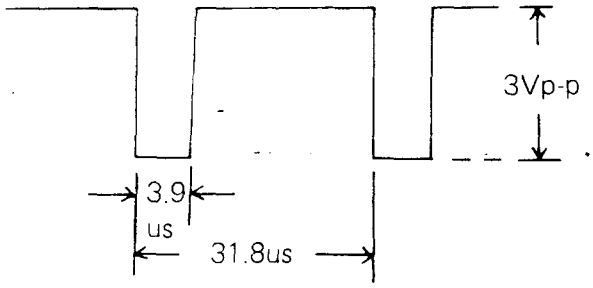
Q721 COLLECTOR (FIG. 7)



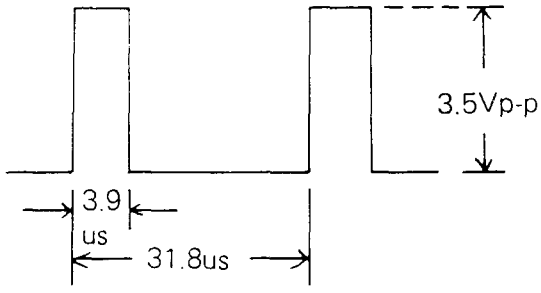
Q711 COLLECTOR (FIG. 8)



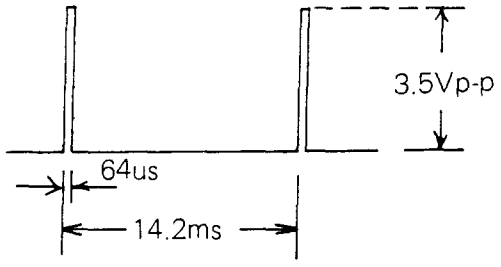
Q701 COLLECTOR (FIG. 9)



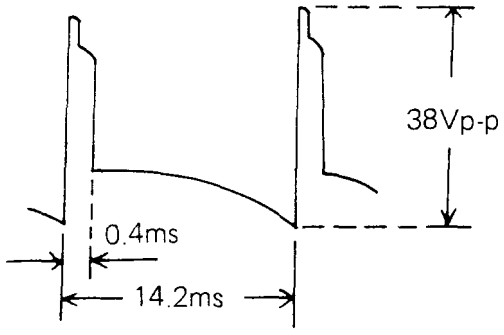
IC02 PIN 1 (FIG. 10)



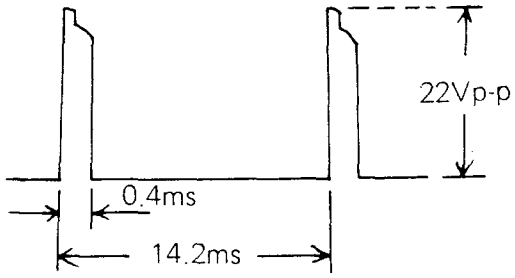
IC02 PIN 3 (FIG. 11)



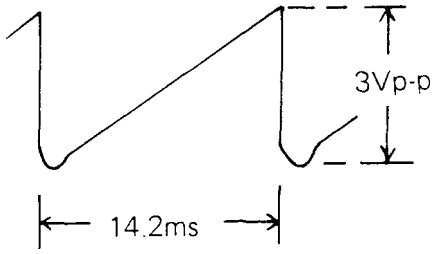
IC02 PIN 11, 13 (FIG. 12)



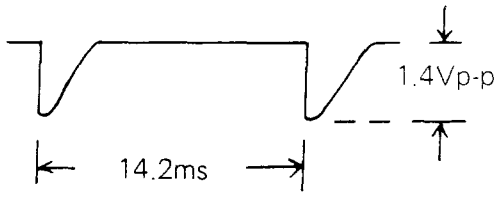
IC401 PIN 1 (FIG. 13)



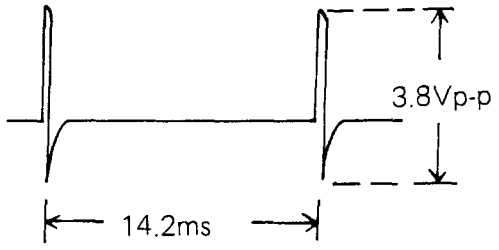
IC401 PIN 2 (FIG. 14)



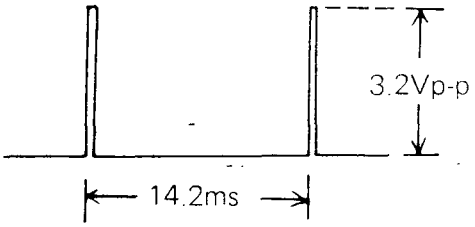
IC401 PIN 3 (FIG. 15)



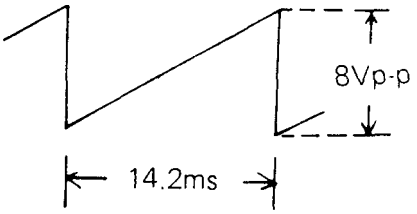
IC401 PIN 4 (FIG. 16)



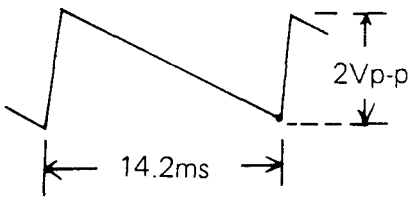
IC401 PIN 5 (FIG. 17)



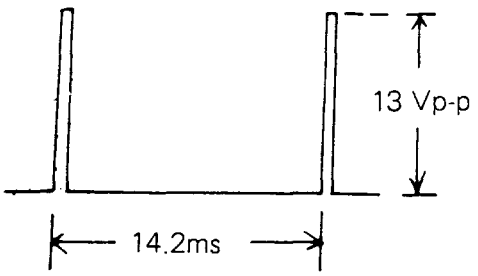
IC401 PIN 6 (FIG. 18)



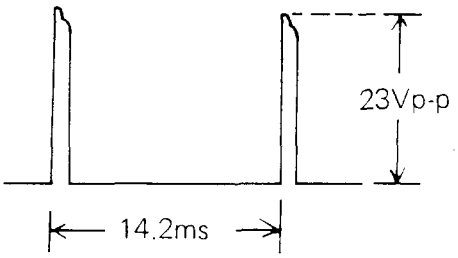
IC401 PIN 9, 10 (FIG. 19)



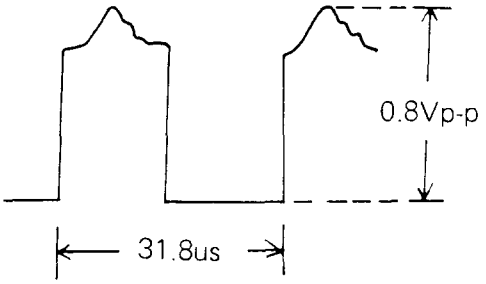
IC401 PIN 12 (FIG. 20)



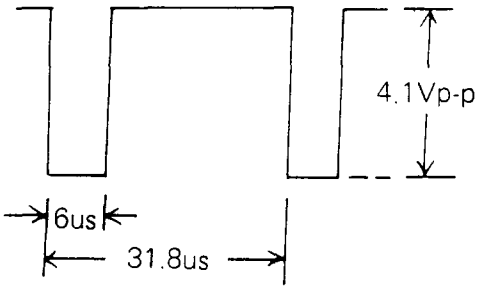
IC 401 PIN 13 (FIG. 21)



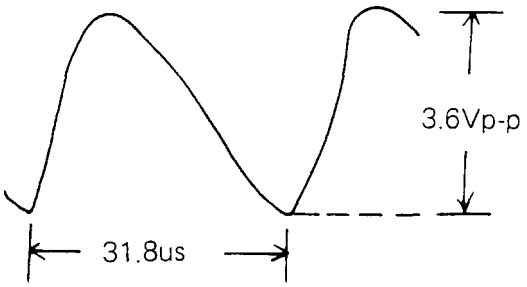
IC401 PIN 15 (FIG. 22)



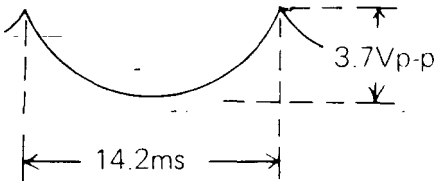
IC501 PIN 1 (FIG. 23)



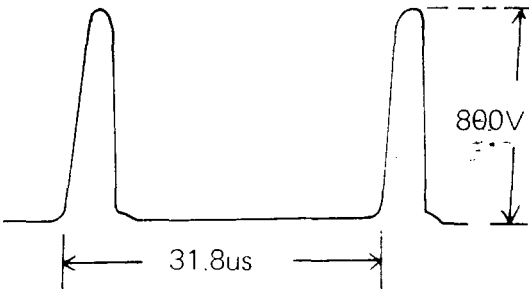
IC501 PIN 3 (FIG. 24)



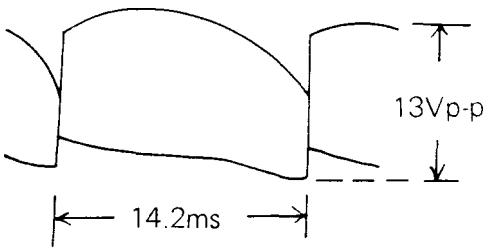
IC501 PIN 4 (FIG. 25)



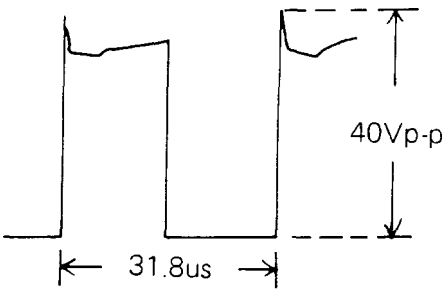
Q801 COLLECTOR (FIG. 26)



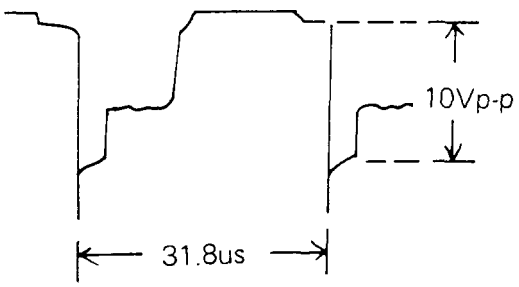
Q502 COLLECTOR (FIG. 30)



Q802 COLLECTOR (FIG. 27)



Q505 COLLECTOR (FIG. 28)



Q502 BASE (FIG. 29)

8 – 2 DC VOLTAGE

1. IC01

PIN # 1 : 12V

2 : 4.3V

3 : 6V

4 : 2.3V

5 : 0V

6 : 2.3V

7 : 0V

8 : 2.3V

9 : 0V

10 : 1.96V

11 : 1.4V

12 : 0V

13 : 1.5V

14 : 0V

15 : 1.5V

16 : 0V

17 : 1.25V

18 : 12V

2. IC02

PIN # 1 : 3.6V

2 : 3.6V

3 : 0.6V

4 : 5.1V

5 : 3.67V

6 : 0.2V

7 : 0V

8 : 3.6V

9 : 5.1V

10 : 0.28V

11 : 0.15V

12 : 0.28V

13 : 0V

14 : 5.1V

3. IC501

PIN # 1 : 0.5V

2 : 0V

3 : 2.7V

4 : 2.3V

5 : 5.4V

6 : 9.4V

7 : 4.2V

8 : 3.8V

4. IC401

PIN # 1 : 11.5V

2 : 20V

3 : 2.6V

4 : 0.4V

5 : 0V

6 : 0V

7 : 6.6V

8 : 0V

9 : 5.5V

10 : 6.0V

11 : 4.3V

12 : 4.0V

13 : 0.3V

14 : 20V

15 : 0.8V

5. TRANSISTOR

Q601 : E : 0V, B : 0V, C : 0V

Q602 : E : 1.28V, B : 0.6V, C : 0V

Q506 : E : 1.1V, B : 1.3V, C : 0V

Q603 : E : 1.5V, B : 0.88V, C : 0V

Q801 : E : 0.7V, B : 1.3V, C : 16V

Q802 : E : 15.1V, B : 14.5V, C : 4.5V

Q505 : E : 18.4V, B : 0.46V, C : 0V

Q503 : E : 0V, B : 0V, C : 7.0V

Q504 : E : 2.7V, B : 2.1V, C : 2.7V

Q501 : E : 0.3V, B : 0.4V, C : 4.8V

Q701 : E : 11.5V, B : 12V, C : 70V

Q702 : E : 69.3V, B : 70V, C : 97V

Q711 : E : 11.5V, B : 12V, C : 70V

Q712 : E : 69.3V, B : 70V, C : 97V

Q721 : E : 11.5V, B : 12V, C : 70V

Q722 : E : 69.3V, B : 70V, C : 97V

Q102 : E : 2.1V, B : 1.4V, C : 0V

Q700 : E : 1.5V, B : 2.2V, C : 11.5V

Q202 : E : 2.1V, B : 1.4V, C : 0V

Q710 : E : 1.5V, B : 2.2V, C : 11.5V

Q302 : E : 2.1V, B : 1.4V, C : 0V

Q720 : E : 1.5V, B : 2.2V, C : 11.5V

Q101 : E : 2.3V, B : 0V, C : 5.1V

Q201 : E : 2.3V, B : 0V, C : 5.1V

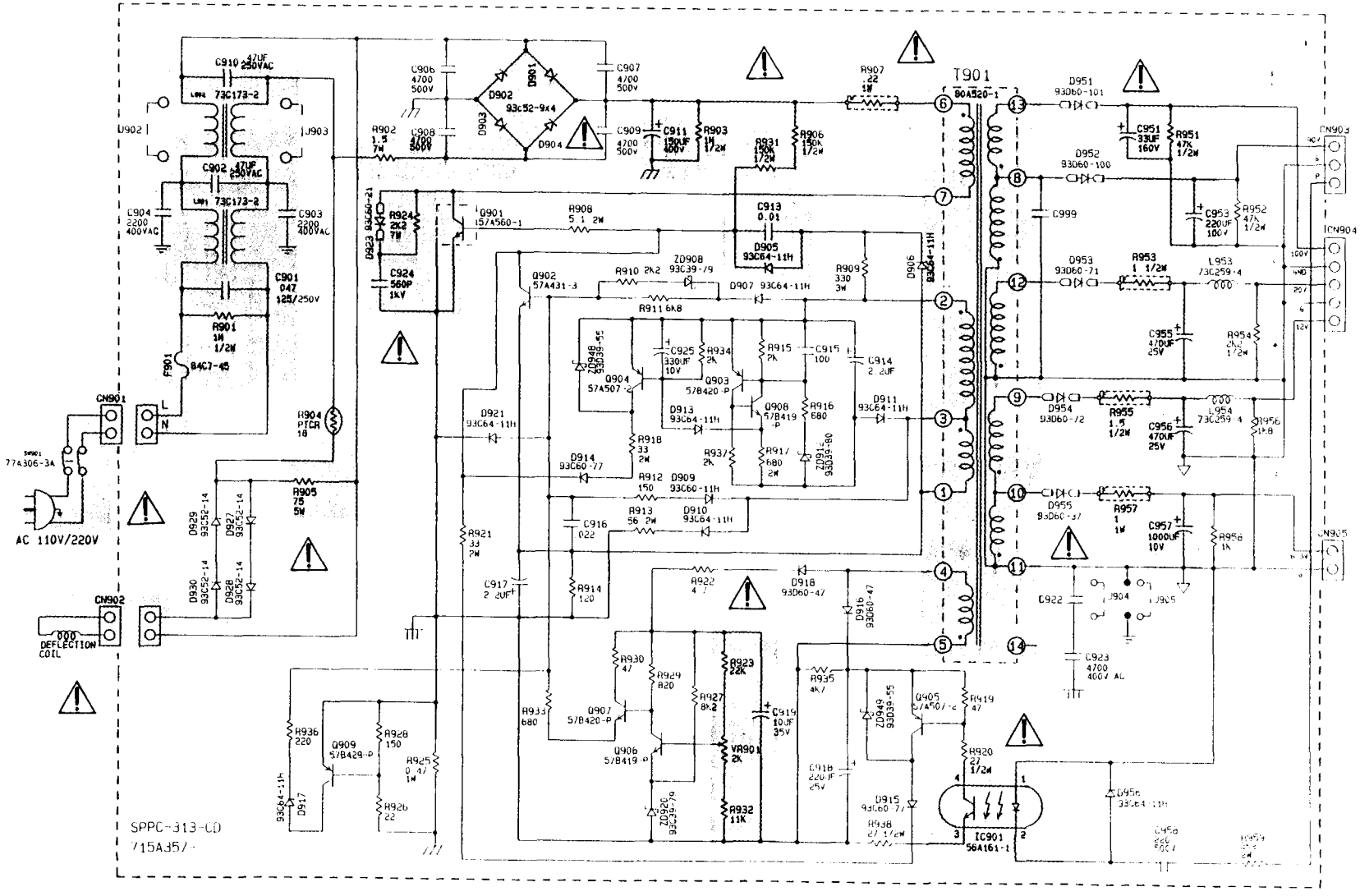
Q301 : E : 2.3V, B : 0V, C : 5.1V

Q201 : E : 2.3V, B : 0V, C : 5.1V

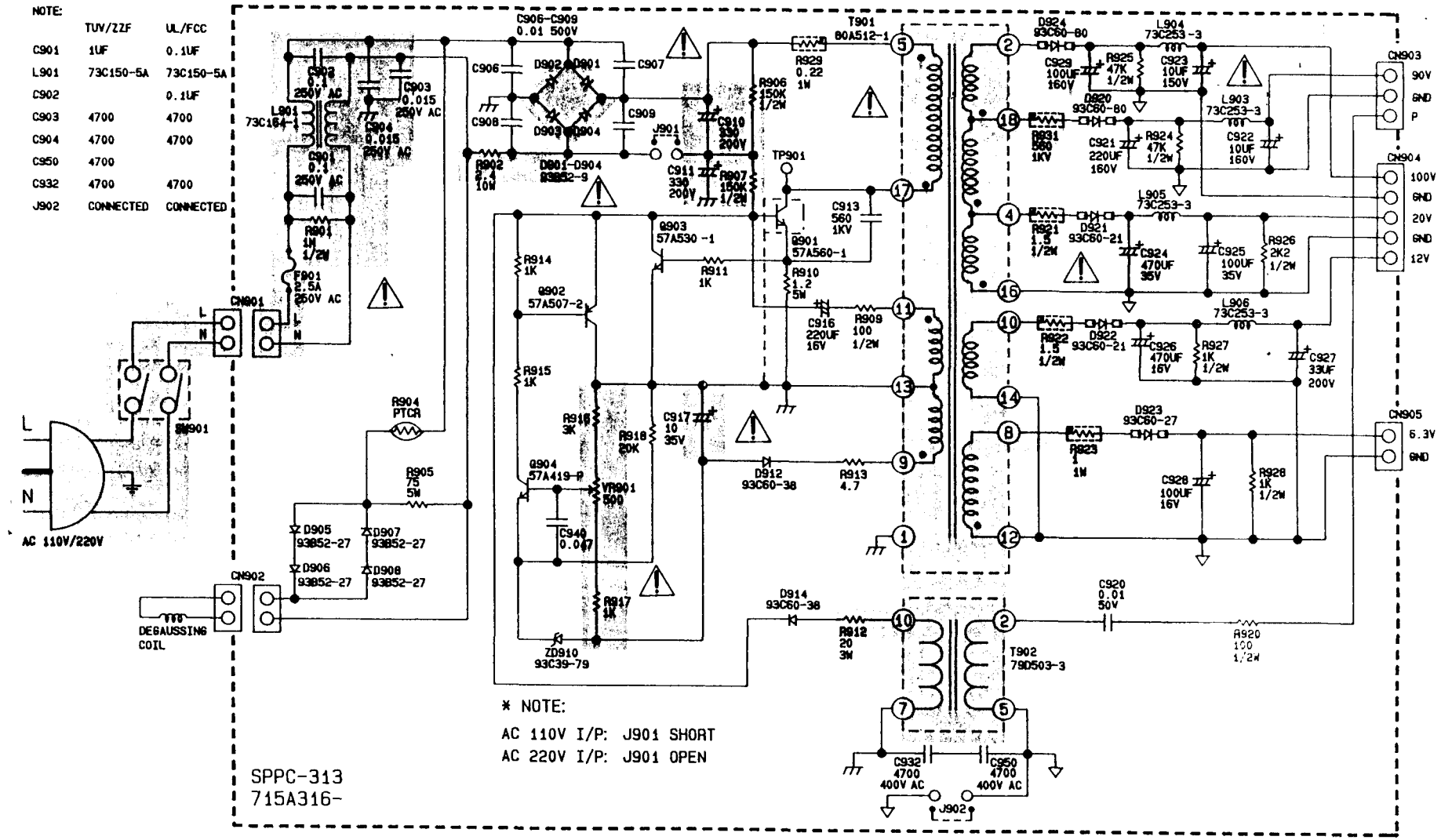
D508 anode : – 230V

ZD01 cathode : 5.1V

ZD502 cathode : 9.4V



11-1 SWITCHING POWER DIAGRAM



SWITCHING POWER DIAGRAM